Use of the optimal hematopoietic progenitor cells (HPC) cutoff value to predict the efficiency of the peripheral blood stem cell apheresis harvest

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利用造血前驅細胞最佳臨界值來預測周邊血液幹細胞收集的成效

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Introduction

In the past, the physicians decided to collect peripheral blood stem cells (PBSC) according to the WBC count of patients. In recent years, many study reports indicate that peripheral blood hematopoietic progenitor cells (HPC) value is more correlated to the CD34+ cell dose in patients.

Allogeneic stem cell transplantation requires 5×10^6 /kg CD34+ cell dose, and the autograft needs 2×10^6 / kg at least. This study was to evaluate the correlation within WBC count, HPC value and CD34+ cell dose in different diagnosis groups.

Methods

1. PBSC apheresis harvest by COBE spectra
2. Total PBSCs : 141 cases
3. During : 2014/01~2016/06
4. Patient number : 105 patients
   ① 35 lymphoma
   ② 40 multiple myeloma (MM)
   ③ 30 allogeneic transplant healthy donors
5. Analyzer:
   ① Sysmex XE-5000 (WBC count and HPC value)
   ② Beckman Coulter FC500 (CD34+ cell dose)

Results

The correlation between WBC count and CD34+ cell dose was not good (lymphoma patients, R=0.055, MM patients, R=0.192, allograft healthy donors, R= 0.456). The correlation between HPC value and CD34+ cell dose in lymphoma patients (R=0.749, P=0.0001, Area under the curve (AUC) = 0.83), in MM patients (R= 0.462, P=0.0001, AUC value=0.88), and allogeneic transplant of a healthy donor (R= 0.574, P=0.014, AUC=0.71) were good.

The HPC cutoff for lymphoma patients was **47 /µl**, MM patients was **70 /µl**, allograft healthy donors was **89 /µl**.
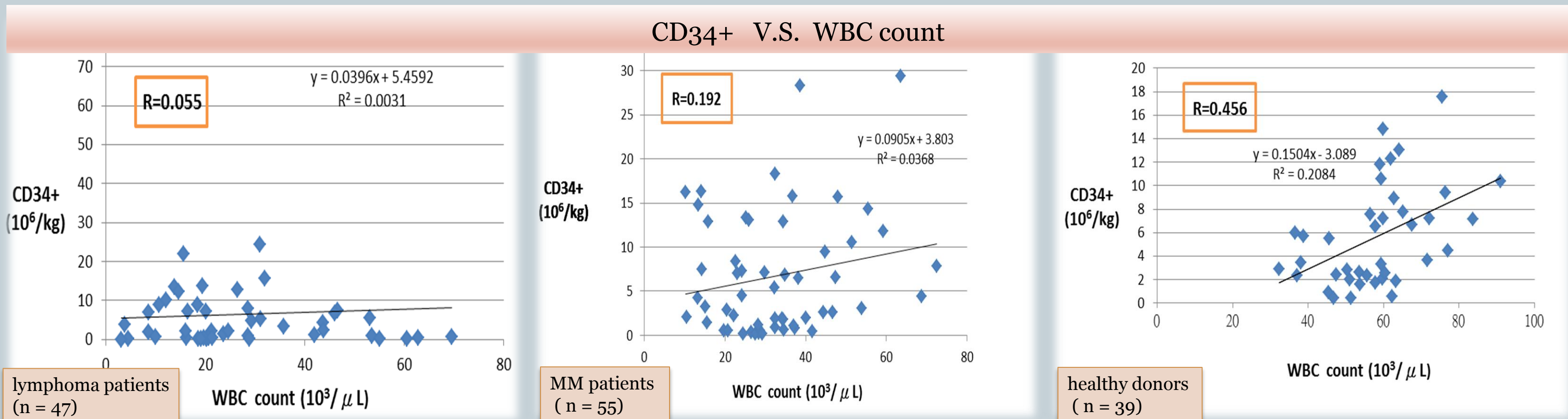

CD34+ V.S. WBC count

Figure 1. the correlation between CD34+ cell dose and WBC count
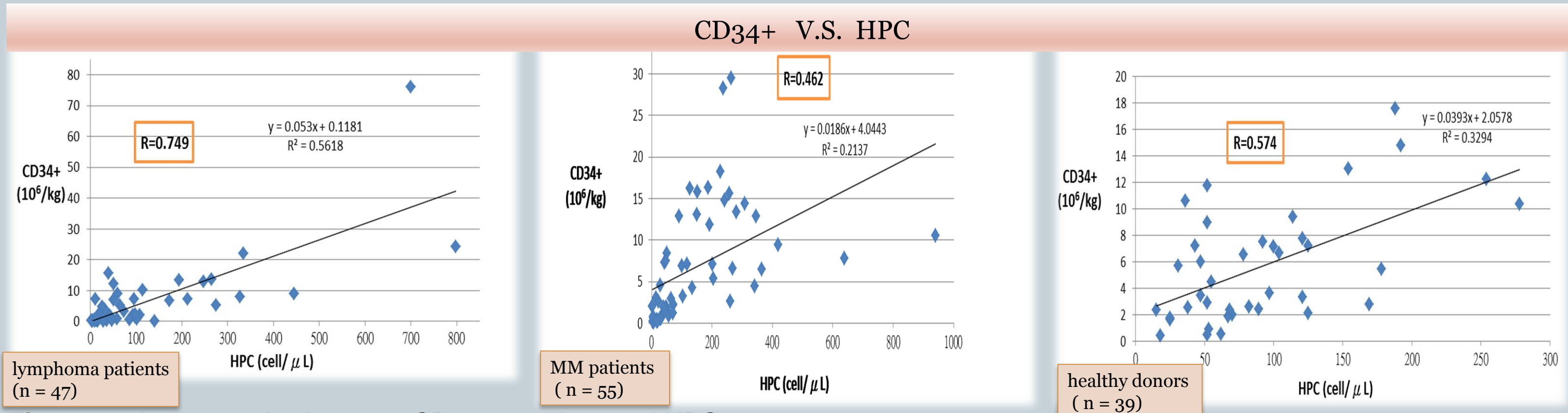

CD34+ V.S. HPC

Figure 2. the correlation between CD34+ cell dose and HPC value
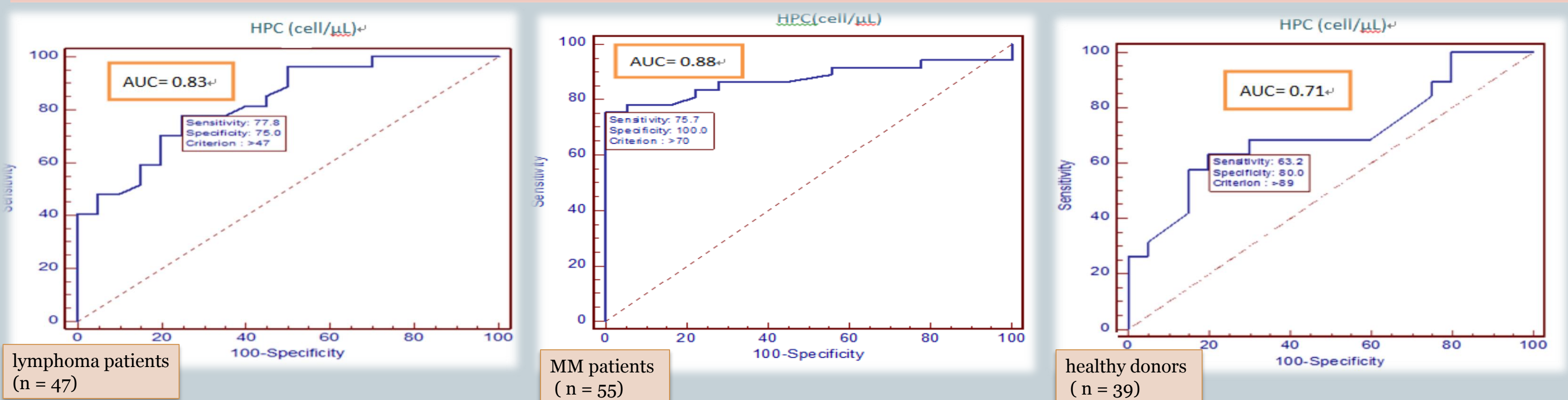

ROC curve

Figure 3. ROC curve (criterion)

Conclusion

HPC value was better than WBC count for optimal time in PBSC collection. The cutoff of HPC value was variable in different patient groups. Therefore, the laboratory should establish its own HPC cutoff value for each patient groups to achieve better predict efficiency.